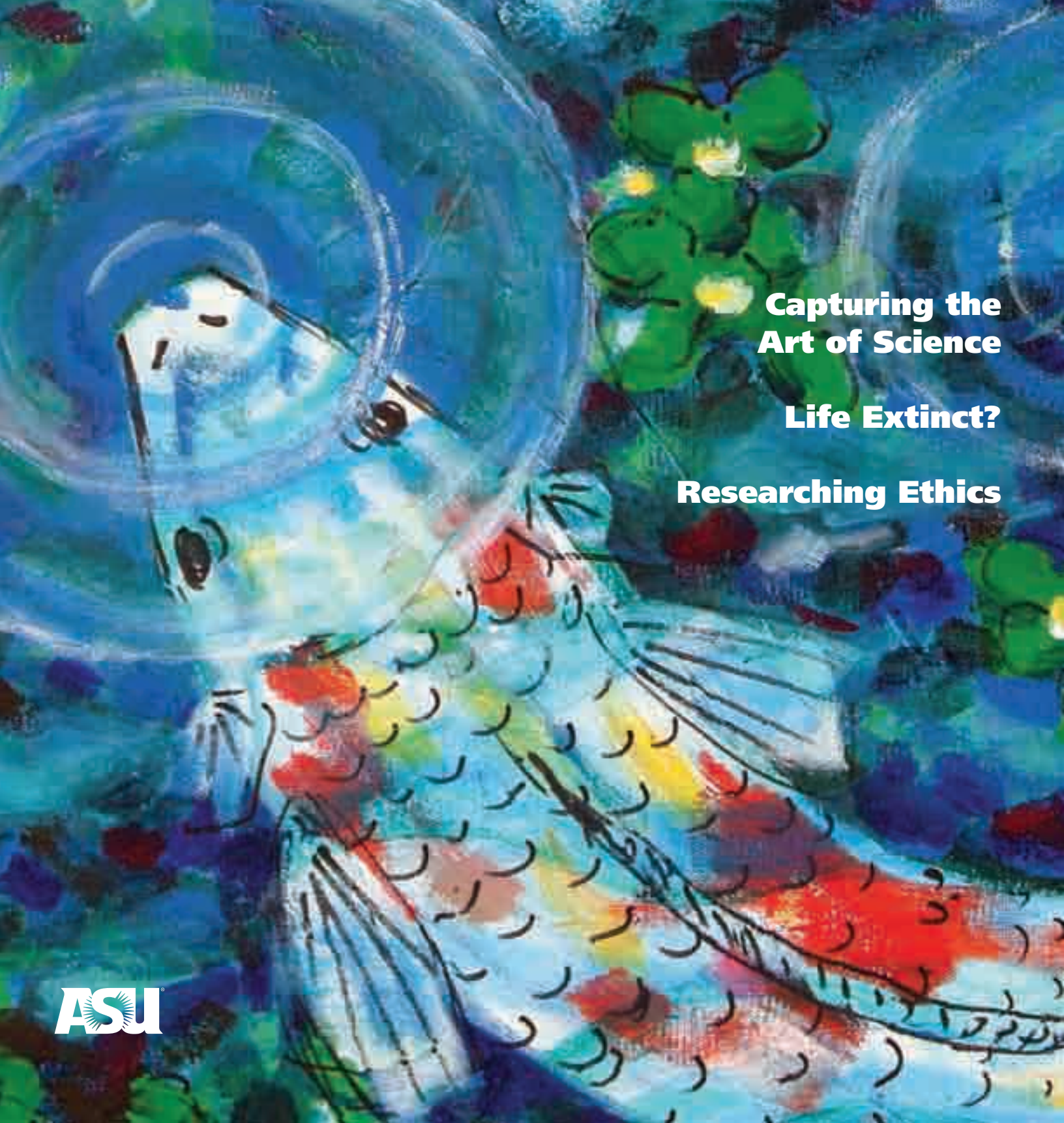


SOLIS



**Capturing the
Art of Science**

Life Extinct?

Researching Ethics

Someone, who will go unnamed,
stood outside my door today
and stated that research with “bugs”
has nothing to do with humans.



While I do like to think of myself as being somewhat more complex than a beetle, there remains the fact that humans are late comers to the scene and many, if not all, of the biological and cellular systems we like to think of as entirely human, have presented themselves in one form or another in other critters long before us. I like to think this longstanding myopia about our place in the world is changing. The extraordinary energy, cutting-edge research, innovative teaching and education outreach, and multidisciplinary collaborations within the Schools, Centers, Colleges, and Institutes at ASU, and beyond, made me believe that this is the case. For the person who thinks that the ant can tell us nothing about humans, I invite them to visit the Social Insect Group or wander over to the new building to speak with Jennifer Fewell, the co-director of the Center for Social Dynamics and Complexity. Or step up to Douglas Chandler's laboratory to see how chemical attractants found in frog eggs can shed light on our own fertility systems. You don't have to look far to see that we are all related to one another, all breathe the same air, all have defined life spans, and all have the power to change our environment, for good or ill. That said, it is true that mankind has much that makes it uniquely human, in its creations: art, science, medicine, sport, technology, and in modes of expression that seem outside the realm of much in nature. In these next two issues of the SOLS Newsletter, we introduce a section that highlights faculty whose scientific creations extend from and are partnered with their artistic endeavors. In addition, you see that we've embarked on our own artistic journey, with Jacob Sahertian leading us toward a new look. I hope that you enjoy seeing the faces of and reading about the students, faculty and staff at School of Life Sciences engaged in innovation, creation, and discovery to shed light on the mysteries and wonders of our shared life on Earth. Let us know what you think; we are always on the look out for feedback – our own brand of SOLS searching...

A handwritten signature in red ink, appearing to read 'M. Coulombe', with a stylized, flowing script.

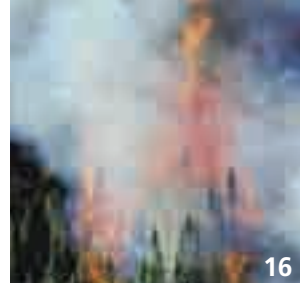
MARGARET COULOMBE



10



9



16

Science Views

award winning director, 2
emerti, 3
cryptology, 4
ethics, 6
lure of allurin, 8
alumni, 10-13

Art

talent has no boundaries, 9, 14

Displays

extensive partnering, 22

A Look at Student Services

jump starting careers, 24

Awards and Recognitions

making a difference, 26

Observations

learning captured, back page



On the Cover

Detail of painting by Douglas Chandler
"Life at the Surface", 1996.

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Director Robert Page elected American Academy Arts & Sciences Fellow

BY MARGARET COULOMBE



Some of the finest minds in the world have been Academy fellows or Foreign Honorary Members...

On April 24, 2006, **Robert Page**, Foundation Professor and director of School of Life Sciences was elected to the American Academy of Arts and Sciences. He joins the ranks of an elite cadre of artists, scientists, scholars and leading civic, philanthropic, and corporate luminaries extending back to the founding of the Academy in 1780. The Academy's mission is "to cultivate every art and science which may tend to advance the interest, honor, dignity and happiness of a free, independent, and virtuous people."

Some of the finest minds in the world have been Academy fellows or Foreign Honorary Members, including: Thomas Jefferson, George Washington, Benjamin Franklin, Marian Anderson, Albert Einstein, Robert Frost, Alexander Calder, Winston Churchill, Albert Schweitzer and Jawaharlal Nehru.

Page becomes part of this year's class of 175 Fellows, a group which includes former presidents, William Jefferson Clinton, George H.W. Bush; Supreme Court Chief Justice, John Roberts; and actor and director, Martin Scorsese. Academy sources cite "170 Noble Laureates and 50 Pulitzer Prize winners" in their current membership.

"Throughout its history, the Academy has convened the leading thinkers of the day, from diverse perspectives, to participate in projects and studies that advance the public good," stated Chief Executive Officer Leslie Berlowitz in an Academy press release. "I am confident that this distinguished class of new Fellows will continue that tradition of cherishing knowledge and shaping the future."

Formal induction ceremonies will take place at the House of the Academy, Cambridge, Massachusetts in October.

A Perennial of Class

BY DAVID E. BROWN

That ASU's campus is rapidly changing is no secret. Buildings, parking lots, and even streets are disappearing with amazing alacrity. So much has changed that one is hard pressed to remember what preceded this or that new edifice (What was where PS-5 now is?). However, one campus institution remains. **Donald Pinkava** can still be seen shuttling from herbarium to herbarium on the third floor of the C-wing of the Life Sciences building.

Donald Pinkava first came to Arizona State in 1964 from Ohio State University, where he did his doctoral dissertation on the biosystematics of *Berlandiera*, a genus of plants in the family Asteraceae or daisy family. Things being what they were back then, he had been hired as an assistant professor of botany after only a telephone interview. The transplant to ASU proved highly successful, Pinkava was soon teaching "Introduction to Botany" and a host of other botany classes. His favorite and most well known course was "The Flora of Arizona," a class that he taught to literally thousands of students over a period of 36 years. It is in this role that he is forever etched in my memory – shepherding a cluster of botany students from one campus plant to another as he describes the family characteristics of each.

"Googling" Pinkava's name results in an encyclopedia of botanical publications and a broad array of botanical experience that even includes a stint as a plant identification witness in a criminal investigation. Also contained in the extensive list of websites is the SOLS's *Ask A Biologist* scientist profile "Sticking to his Subject" (<http://askabiologist.asu.edu/profiles/pinkava/pink.html>). For the most part though, plant systematics and taxonomy have been his *forte*. It was in this capacity that he served as an advisor to the U.S. government, supporting decisions about which cacti and agaves to protect under the Endangered Species Act. In addition to ensuring that future generations will be able to share in the full wealth of the Southwest's floral bounty, Pinkava has also tutored innumerable graduate students; served as Arboretum Committee advisor to former ASU President Lattie Coor and was instrumental in publishing the guide book that identifies the campus' rich assemblage of trees. A tireless curator, the number of collections in the ASU herbaria has grown from about 13,000 specimens to nearly 30,000 during his tenure!

Having begun his career in composites, Pinkava continues to work with Asteraceae. He currently investigates problems associated with the hybridization of the genus *Hymenothrix*, a delicate yet sturdy desert flower. He also studies cacti, as befits a professor at a Southwest desert university, and plans a book on the chollas in collaboration with **Marc Baker**, adjunct professor, and Jon Redman of the Environmental Conservation Center – figuratively and taxonomically the prickliest genus in North America. In addition, he continues to guide graduate students such as **Raul Puente**, who works with the cactus, *Nopalea*, and curates ASU's cactus collections.

Pinkava remains a busy man in pursuit of a plethora of writing and herbaria projects. He is on the Editorial Committee for the forthcoming "Vascular Plants of Arizona," and is currently reviewing a book, "North American Flora." Such a schedule, while rigorous, is what the term "emeritus" is all about. Let's hope that Don Pinkava continues to be as perennial as his subjects.





Species Cryptology: from Mexico's Sierra Madre to Arkansas

BY DAVE BROWN

Proving that a species no longer exists is even more difficult than finding a rare animal that wants to remain hidden.

Few people realize that the largest woodpecker in North America is not the ivory-billed woodpecker but the imperial woodpecker, and that this species very likely became extinct within the memories of people yet living. That it did so, without anyone ever collecting one of its eggs, raising one in captivity, recording its calls, or even publishing a photograph of a living bird, is nothing short of amazing.

Ever since I first went to Mexico's Sierra Madre Occidental in March 1970, I have been intrigued with the idea of locating a remnant population of imperial woodpeckers. Many of the bird's most recent and promising haunts have since been visited; including a number of sites "birders" have never seen. These quests have continued into recent years with the help of **Kevin Clark**, a former ASU graduate student in ornithology, who is now a biologist with the U. S. Fish and Wildlife Service.

A large and trusting bird, the imperial woodpecker was avidly collected as a curiosity, as a museum specimen, for food, for decoration, and for its supposed medicinal properties. As a result, no one in Mexico, visitor or resident, has been able to produce an imperial woodpecker for more than 25 years. Although we have located some 160 museum specimens housed in various institutions throughout the world, we have reluctantly concluded that a breeding population no longer exists. Nonetheless, by examining these “study skins” filed away in museum drawers, coupled with the field notes of their collectors, we have gained a number of insights into the reasons for the birds demise. Simply put, the range of this Mexican endemic was limited by the yellow pines and long-horned beetle larvae that provided its major food source.

As a result of our investigations, Kevin and I were invited to attend a conference on large woodpeckers held the first week in November 2005, in Brinkley, Arkansas. We presented our findings along with others who had studied other such *carpintero grandes*: North America’s pileated woodpecker, South America’s Magellanic woodpecker, and Asia’s Great Slaty woodpecker. However, the highlight of the conference was a series of presentations that announced the recent discovery of an ivory-billed woodpecker in Arkansas – the first recognized “sighting” of this bird since 1944.

The Brinkley event can only be described as a cultural spectacle. As key conference participants elaborated on various aspects of the ivorybill’s discovery along the Cache River, Brinkley’s residents were enthusiastically celebrating the bird’s resurgence. Ivorybill memorabilia was everywhere. There was an “Ivorybill” newspaper put out by the chamber of commerce along with ivorybill hamburgers, ivorybill haircuts, and ivorybill furniture. Special ivorybill license plates are being planned, and efforts are underway to purchase thousands of acres of potential ivorybill habitat. The sighting of a single bird had put Brinkley on the map.

Unfortunately, the evidence was less convincing that the testimony of the ivorybill observers. The much-touted video of the observed bird was brief, shaky, and inconclusive. The audience was left wondering whether the bird shown was simply a pileated woodpecker with extraordinarily large, white wing patches. Recordings of purported ivorybill calls, despite much acoustical analysis, were also less than “air-tight.” Still, the observers and their backers from the Ornithology Laboratory at Cornell University were convinced of the bird’s presence.

Soon after we returned, two bird-watchers reported seeing a female imperial woodpecker above Copper Canyon in the “Tarahumara Country” in Mexico’s state of Durango. Their testimony appeared credible enough. But again, no one was able to show anyone an actual woodpecker. Too bad that no one has a video and a recording. If they did we might be treated to Copper Canyon burgers and a buyout program!

It’s now the summer of 2006 and the “Watch on the Cache” is more history than news after the expenditure of tens of thousands of dollars. Nor has there been any further mention of imperials in Copper Canyon despite a plethora of visits. But then, that is why the search for lost species is called cryptology – the study of buried things.





Biology & Society: where Dr. Frankenstein meets Dr. Maienschein

BY MARGARET COULOMBE

When Mary Shelley wrote her novel, *Frankenstein*, present day research on topics like cloning, stem cells, the human genome, and nanotechnology would have seemed as fictional as her protagonist Frankenstein's creation of his monster. Still, Shelley's 19th century parable about man's ill conceived creation – plundered from gravesites, imbued with life – which ultimately destroys him, carries a warning as relevant today as it was two centuries ago.

While the rapid pace of scientific discovery offers advances for technology and medicine, this pace often outstrips public understanding and social policy. Lacking regulations, restrictions, and responsible conduct in research, scientific discoveries could present Frankenstein-like hazards for present and future generations. To help assure that they do not is where individuals, like **Jane Maienschein**, ASU School of Life Sciences Regents' Professor and Parents Association Professor, and institutions, like the Center for Biology and Society, step in.

"Judgments are made every day about what science to fund, which experts to trust, which results to report. Our

[SOLS] Biology and Society program studies the history and philosophy of biology and the way biology, bioethics, and biopolicy play out in society. We combine analysis of the standards of evidence, theories, laboratory practices and experimental approaches with study of people, institutions, and changing social, political, and legal context in which science thrives. This provides a rich understanding of the nature of science and scientific change," states Maienschein.

Arriving at ASU in 1981, Maienschein is now part of the Human Dimensions faculty group within the School of Life Sciences, where she also serves as director for the Center for Biology and Society. The Center gained the Regents' formal approval when the School of Life Sciences was organized in 2003 and now involves 22 SOLS faculty and 20 others outside of the school.

What drove the creation of the Center? Maienschein says that it started with ASU undergraduates: "Many of them were taking double majors: biology and political science, biology and English, biology and sociology, biology and

ethics. Some of our brightest students came to us and said, 'We want something that puts the biology together with the world, with society.' So we invented an undergraduate major. And then we thought, well if that's good for undergraduates, why not for graduate students too?"

It is fitting that the Center's formation started with the students. Maienschein notes that while most Centers focus primarily on promoting research, the Center for Biology and Society's central mission includes promoting undergraduate and graduate educational opportunities, building collaboration and community, and nurturing "teacher-scholar-citizens" around three areas of concentration: History and Philosophy of Science; Bioethics, Policy and Law; and Communicating Science.

The SOLS Biology and Society major is unusual too in that each undergraduate student is required to take a Research Colloquium class and complete an independent research project. Students define a research topic, consider what questions they are going to ask, what methods they are going to use, and

which mentor they are going to approach for guidance.

“We tell them to be creative and do what they love. Don’t worry about fitting in any box, think about where you want to go and develop skills to get you there,” says Maienschein.

As a result, colloquium thesis research can result in very different forms of expression. For example, **Allison Karow** took an upper division biology course with **Les Landrum**, “Arizona Trees and Shrubs.” She was inspired and produced her own personal interpretive records around plant galls, “an uncontrolled plant cell growth caused by parasites,” in the form of illustrations and studio art. She also archived plant specimens for the herbarium and natural history collections at ASU. Karow won a Biology and Society Unusual Student Project Grant and had a gallery opening of her work, entitled, *Megaspora*, in downtown Tempe’s Neti Neti Gallery.

Another student, **Kristin Bolfert**, focused her study on the sexually transmitted disease, human papilloma virus. Bolfert did a survey and asked: How many people at a college age really understand and know about this virus? How many people get tested and know that there’s a vaccine for HPV? Bolfert presented a poster for the College of Liberal Arts and Sciences Undergraduate Research Symposium entitled: “HPV: A Misguided Approach to Education,” which won the College of Liberal Arts and Sciences 2005-2006 Award for Excellence in Research in the Humanities.

Sarah Lusk was a Bioethics Fellow in the SOLS Biology and Society program. Her research project and honors thesis involved working with a local health clinic for the uninsured, the Wesley Community Center’s Centro de Salud. The clinic was built by the community in Nuestro Barrio neighborhood in Phoenix. She examined the impact

the clinic had on the surrounding community’s health and social support systems and the importance of culturally competent care and information. She also examined the impact when the clinic was burned – apparently in protest against undocumented immigrants – and the efforts of the community to rebuild.

Such multidisciplinary study, investigative insights, focus on communication and engaged educational outreach may be why, of the 17 students graduating with honors in the life sciences in May 2006, eight of them were mentored by Maienschein.

Maienschein’s ability to focus on each student’s particular talent, as well as efforts to create new forms, venues, and methods to communicate science and understanding of scientific and ethical issues may be what earned her the 2006 Gary S. Krahenbuhl Difference Maker Award. These characteristics may also be what have attracted dynamic assistant professors to School of Life Sciences, like **Jason Robert**, who directs a sophomore learning community in “Medicine, Society, and Public Health: Making Better Choices,” and **Manfred Laubichler**, who won the College of Liberal Arts and Sciences Dean’s Distinguished Teaching Award in 2006. The development of SOLS and establishment of the Center also attracted Lincoln Professor **Joan McGregor** to head the program in Bioethics, Policy, and Law, and professor **Richard Creath** to direct the History and Philosophy of Science Program within the Center.

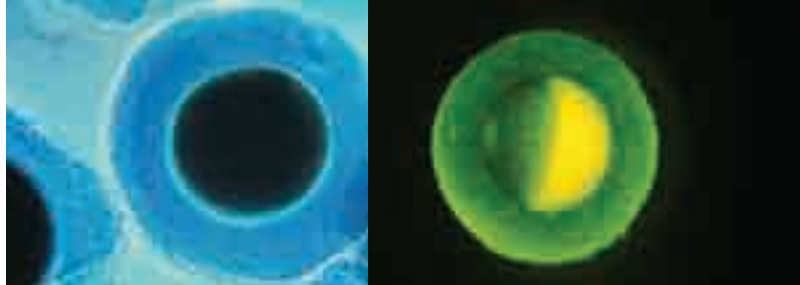
While the Center’s nexus is in School of Life Sciences, it is a multidisciplinary group that draws members from biology, philosophy, political science, history, religious studies, law, sociology and ethics; and which interfaces with many other groups, including the ASU’s Center for Nanotechnology and Society; Consortium for Science, Policy and Outcomes; Center for Law, Science

and Technology; Responsible Conduct in Research program; and beyond ASU with the Mayo Clinic – Scottsdale; the Arizona Consortium for Medicine, Society, and Values; Max Planck Institute for the History of Science in Berlin; and Translational Genomics Research Institute (TGen). Fall of 2007 will also see two new members joining the Center, **Karin Ellison** (coming from the University of Wisconsin to head the Responsible Conduct of Research Program) and assistant professor **Andrew Hamilton** (coming from UC San Diego and UC Davis).

“It’s the ASU model that has lots of intersecting things. It’s all about training grads, undergrads, building teams – all the time thinking about biology in society, thinking about human dimensions; and biology’s place within the whole of social and intellectual culture,” explains Maienschein.

Some of the newest directions for the Center involve building connections with SOLS Natural History Collections and professors like **Kathleen Pigg** and incoming systematist and ASU Interim Divisional Dean for Natural Sciences and Mathematics, **Quentin Wheeler**. The two groups are collaborating on exhibits and discovering a strong natural affinity between those working on natural history and those interested in the history of science. “There’s a deep respect for the changes over time in species, in sciences, and our understanding about the sciences. There are a lot of parallels,” Maienschein notes.

One thing is certain, if Mary Shelley lived today and had come to ASU as an undergraduate, she would have most likely found a creative home for her novel thesis work in Biology and Society. What warnings – perhaps mixed with understanding of opportunity – would her creation have carried then?



Sea urchin eggs (blue) and frog egg (green) treated with stains.

His science: The Lure of Allurin

BY MARGARET COULOMBE

Let's not mince words, **Douglas Chandler's** office walls are covered with oil paintings; scenes that strike a cord in all of us: the beach, the mountains, and a waterfall. However, two paintings of very similar scale and composition straddle a central file cabinet, and take us beyond the bounds of vision. One depicts Earth from outer space – a planet in a highly colored galaxy; the other inner space – where two *Xenopus* sperm spiral toward the crimson, outer gel coat of a frog egg like orbiting rockets approach the ionosphere.

Chandler's sense of humor is ever present, but in truth fertilization does loom that large in his research. He examines the events, at a molecular and cellular level, that differentiate between a genetic home run and striking out. His main subject of study is the outer coating of eggs – the gelatinous coating that you typically see around frogs' eggs in ponds. According to Chandler, these coatings turn out to be very important. They protect the embryos and they also affect the sperm.

"The coating keeps a lot of sperm from reaching the eggs – acting as a physical barrier so that only about 2% of sperm that enter the jelly actually reach the surface. I suppose that Darwin would say that only the strong survive the competition? The jelly coat also modifies the sperm as it passes through. It serves as a storehouse of certain peptides; biological hormones which bind to sperm and elicit physiological responses."

These responses can be different depending on the animal species. Some sea urchin egg peptides initiate, stimulate and maintain swimming in sperm. They also prepare the sperm for interaction with the egg, says Chandler, "acting as binding sites, something like parking lots outside of a store. You'll attract more customers if you have a place for them to first park."

What is of the most interest to Chandler are those peptides found in the egg coating that act as chemoattractants, literally chemicals that attract. In frogs, these peptides act like designer perfumes, attracting frog "princes": sperm follow a gradient (with the highest concentration found near the egg) and are lured to the "right" spot. Romance in the pond complete!

Chandler first isolated this chemoattractant – the first discovered in vertebrates – and named it, appropriately, Allurin. One hundred and eighty four amino acids that say: *Hey Daddy, come to Momma.*

If it's good enough for frogs, what about humans? Interestingly, Chandler has been able to clone Allurin, sequence it, and has found that it is homologous to a number of mammalian sperm binding proteins. He will delve deeper into this work with the support of a new National Science Foundation grant that examines vertebrate sperm chemoattractant structure, activity and evolution.

"Allurin is structurally related to several mammalian sperm-binding proteins and it has been demonstrated that human eggs do chemically attract sperm. Intensive study of the relationships between these sperm attracting proteins and mammalian reproductive mechanisms may spawn new ways to enhance fertility or ensure contraception," says Chandler.

The potential impact of human analogues could have enormous impact, but until that time comes, it seems that men and women will have to fall back on the more typical mechanisms of wooing: Chanel; an Arizona Diamondbacks game; late night drinks, coffee, dessert – or perhaps, an art opening?



His art: The Lure of Alizarin

Not all that attracts is chemical. Alizarin is a pigment; crimson to be exact. The color's attraction is equally personal for the artist that wields it and the viewer that sees on canvas amidst a larger palette of pigments. What do Alizarin and Alizarin have in common? Doug Chandler thinks quite a bit:

"I like to think of all creative endeavors having some similarities. Both art and science involve communication and expression. Most models in science are mathematical equations or drawings. It is a way of hanging your ideas on it so everybody can see how you are thinking and what your concepts are. And that's not so different from creating a work of art. It is a visual record of ideas and creativity that can be observed by others. The standards of how you pass muster in each field are different, but the creative aspects I think are quite similar. The most important thing is the joy of creating. And perhaps all secretly hope that something lasting may come of it. We hope just a little bit of our work is good enough to be regarded by future generations."

How did Chandler become involved with his science and his art? Like many people, he was influenced by connections forged early in his life. For Chandler, who grew up in the small town of Mystic, Connecticut, science became exciting because of the teachings of his second year biology high school teacher, Arthur Carlin.

And his art? According to Chandler, it was Mrs. Everett, mother of one of his two best friends (Ernie Norcia and Dana Everett). She wanted Dana to take lessons with a professional artist, but hoped the other boys' families would share costs. All three of the boys signed up, spending four years of their Saturday afternoons pursuing oil painting with two locally known artists.

"Mystic Connecticut is a small, picturesque town on the coast, a nice place where an artist might like to live. They have an art festival that has been going on for the last fifty or so years, focused on art rather than crafts. We submitted things several times. It was fun and you got newspaper articles written about your work," Chandler notes.

While all went their separate directions after high school, with Norcia off to Rhode Island School of Design and Chandler on to University of Rochester, these two old friends ended up in Baltimore for graduate school. Norcia went to art school at the Maryland Art Institute and Chandler to Johns Hopkins Medical School. Chandler remembers that one of the fun things they did together was to "organize a tiny workshop symposium that brought faculty and students from the medical school and the art school together to discuss and compare the creative aspects of art and science and how they were similar and different. I don't know how they all viewed it, but certainly Ernie and I were convinced there were similarities."

While Chandler asserts that he was the "least talented" of the three, now when he is not at the bench delving into the biochemistry or molecular biology of attraction, he might be found painting. He likes landscapes or abstracts, though he says this likely stems from the fact that he hasn't had much practice working with people and portraits. I asked him to tell me about three of the paintings in his office:

"This is a typical scene. I don't know where the road is going to or the countryside it's traveling through. It looks like it goes to the mountains and I like the mountains," Chandler laughs. Perhaps his mind touched on Sedona, with a predominant rouging of the landscape. A companion painting shows a beachscape, perhaps at sunset, with deep blues in the foreground and a brilliant sky filled with red.

The allure of Alizarin crimson? Chandler explains: "Basically they [the paintings] are compositions in color in the form of landscapes. I intentionally tried to see if I could add bright oranges and reds and make it work. But I don't have a "haystack period" like Monet, I was just exploring that."

And the sperm in space picture? Chandler smiles widely, "Well, this is the one picture out of all the ones I've done in the last 10 years that has to do with our research. It is meant to represent the surface of a frog egg with the sperm approaching. Xenopus sperm swim like a corkscrew, though perhaps there aren't all those colors... call that artistic license."



ASU Entomologist helps Medical Professionals to get the Bugs out

BY MARGARET COULOMBE

Michael Quinlan is an associate professor of physiology, in the Department of Basic Science at Midwestern University's Glendale campus. As an instructor and researcher with a professional school, he teaches students with the Arizona College of Osteopathic Medicine, the College of Pharmacy and physician's assistants.

The University's focus is uniquely human, but Quinlan's experience and understanding came from the study of a much smaller organism: the beetle.

"I grew up in the southern half of California. We lived in a small town near Fresno: Hanford. When I was a kid, I was the solitary child who would go off into the field and collect bugs."

His interests in biology led him to pursue a degree from the University of California at Riverside. "While arid areas don't sound like a congenial place to find wildlife, it was out there. I became interested in desert ecology, arthropods and scorpions."

Still Quinlan didn't always expect to become a teacher or an academic: "I enjoyed science and I had a facility for it, but I didn't know from the get-go that I was definitely going to be a scientist. I finished my undergraduate degree and took a year off. I wasn't quite sure what it was I was going to do. That possibility evolved slowly over the course of my graduate career."

Quinlan applied to graduate schools in Oregon and Arizona, ultimately choosing the laboratory of **Neil Hadley**, then professor of zoology at ASU.

"Neil wrote me back. It was that personal contact that made the difference. I took a master's first, because I was insecure about my abilities to offer something to the scientific world. That worked out well and I decided, 'well I came this far I should get the whole thing.'" Quinlan completed his Ph.D. in Zoology (physiology) and then went on to do postdoctoral fellowships at the University of Utah and McMaster University in Canada.

What brought him back to the Southwest? "I began to notice in Riverside that when my friends were always headed to the beach, I was heading east, into the desert. When I was in Canada, while every place has times in the seasons where they are beautiful, I just wanted to be back in the Southwest again."

Quinlan's research is centered in Arizona and on the insects that occupy its diverse habitats. His recent work, funded by

the National Science Foundation, involves a broad comparative study of the respiratory physiology of a wide range of beetle species. His study takes him on the road, from the Mogollon rim south to the Chiricahua Mountains where the American Museum of Natural History maintains the Southwestern Research Station.

"It's fun. You get to travel in all these beautiful areas in Arizona and if you like roaming around collecting insects, which I do, then it's great."

With his obvious love of research, the biggest surprise for Quinlan has come as he's moved forward in his career with Midwestern: "I've discovered how rewarding teaching can be. You have so little experience teaching when you are a graduate student; it's hard to get a sense of the value and impact that you can have as a teacher."

According to Quinlan, the most gratifying aspect of teaching is seeing doctors who were trained – who he actually interviewed for admission – come back to the community as practicing physicians and important members within their communities.

Besides research and teaching, Quinlan's newest passion is environmental advocacy. He is a board member of the Arizona Wilderness Coalition (www.azwild.org). The group helps to identify federally owned lands to be set aside for protection as the BLM and Forest Service develop plans for the areas under their control. AWC coordinates the efforts of the various grassroots groups across the state advocating for road-less wilderness, and wild and scenic river designations.

"Roads bring in invasive species, a huge problem right now" – but perhaps they also bring in one biologist with a bent for beetles who is illuminating physiology through his teaching?



Of Algae and Men: Ecosystem Restoration inspired by SOLS and Steinbeck

BY MARGARET COULOMBE

Bradley Cardinale grew up in Mesa, AZ. Though a child of the desert, his boyhood fascination with biology peaked when he saw the 1982 movie, “Cannery Row” made from John Steinbeck’s novel about the life of a young marine biologist in Monterey, California.

Despite this early interest, the road to his present position with the University of California at Santa Barbara’s (UCSB) Department of Ecology, Evolution and Marine Biology did not start out smoothly.

“I wanted to become a marine biologist. Even as a kid, I’d always been concerned that we were using natural resources in ways that might not be sustainable. So I thought that I could address this problem with fisheries, but a counselor told me in 7th grade, ‘you’ll never make a living doing this. Forget about it.’” And so Cardinale did. When he came to ASU from Phoenix Community College his thoughts were centered on a more lucrative career in civil engineering.

"I was an aimless undergrad who had declared civil engineering, but hated it. Civil engineering seemed to exacerbate my worst fear, which was to die having not made any difference in how we think about the world."

Then Cardinale stumbled onto an ad for a summer Research Experiences for Undergraduates (REU) position with **James Elser**, professor in School of Life Sciences. Elser had an NSF-funded project to understand what factors control the biological productivity of entire lakes and coastal marine ecosystems around the country. Cardinale applied and got the job.

"It was the first time I'd done research and been immersed in a group of people who were intensely passionate about their work, and who believed they were changing our view of how nature works." Cardinale was hooked. He worked for Elser for two more years.

"At lab meetings we'd be talking about data or a paper. Jim would jump up, shouting, writing on the board while everyone was struggling to keep up with him. Half the time I didn't know what Jim was saying, but I loved his enthusiasm," Cardinale jokes. He considers Elser single-handedly responsible for the path that he took. He calls Elser his "academic grandfather."

"I think that 90% of the people who get turned on to science find their way through some dynamic professional. Jim was a great mentor," he adds.

Cardinale went on to receive his undergraduate degree from ASU in 1993, followed it up by a M.S. from Michigan State University, a Ph.D. from University of Maryland and a postdoctoral fellowship with the University of Wisconsin, Madison. He was hired as an assistant professor in 2005 by UCSB.

How does he like his new position?

"I love it. I have colleagues in one of the top ten ecology and evolution programs in the country who challenge me to think in new directions every day. Not to mention I'm five minutes from the beach, and five minutes from the mountains." Cardinale notes that 2005 was a banner year; he settled into his work, his new home and acquired his first National Science Foundation grant, a benchmark for every new young professor. Two graduate students and post-docs will join his lab this coming year.

Cardinale's research falls into three areas: biodiversity and ecosystem processes, community assembly and restoration ecology.

"Global loss of biodiversity ranks among the most dramatic environmental changes in modern history. But we still don't know what species do in ecosystems. For example, how many species do we need to keep food on the table, our water and air clean, and pests and diseases in check?"

His new facilities are uniquely suited to his work, in addition to microscopes and the usual laboratory paraphernalia, his facilities boast 100 re-circulating streams or flumes.

"If you run your finger across a rock in a flowing stream in Phoenix - though granted there aren't many of those - the film you remove from a rock could hold between 10 to 200 species of algae and small animals. These flumes are mini-experimental streams that allow me to manipulate the numbers of species of both algae and invertebrates to determine how biodiversity impacts nutrient and pollutant uptake from the water."

Besides studies examining the role that diversity plays in ecosystem functioning, Cardinale also examines how we might restore ecosystems that have been degraded.

"There is a hypothesis out there that says: if you provide the correct habitat, organisms will re-colonize on their own, and that the productivity of the stream will recover naturally. This is often called the "Field of Dreams Hypothesis" (after the 1989 baseball movie by Kevin Costner). This view is a bit naïve, so I ask the questions: How do you really rebuild a food web? Do we have to restore all of the species for the stream to return to normal levels of productivity?"

In a world where 50% of the existing, described species could become extinct in the next century, Cardinale and others like him may be on the cusp of research that tells us how many species we need to conserve to sustain biological processes that are fundamental to all life. That is certainly something to make your academic research grandfather proud.

Quilting and Research Ties

BY MARGARET COULOMBE



When **Nancy Lesko** first returned to the former biology office in 1997, she had no idea that her quilting art would grow to become an inextricable part of her experience in the School of Life Sciences: “I found a group here, mostly graduate students, research technicians and postdoctoral fellows, that had come from the Midwest and gathered socially on Sundays to quilt.”

Now manager of the faculty and administration office for School of Life Sciences, Lesko has gone on since to make commemorative quilts, baby blankets, vests and ties to adorn both ASU faculty and presidents. Two of her quilts hang on the walls of the SOLS administration office. One made in 1999 celebrates the formation of the former department of biology. It is made of squares, each supporting a bottle made of material patterned with bugs. The other is dedicated to SOLS when it was inaugurated in 2003.

Commemorative quilts, okay, but why ties? “The ties were something that came up because I saw this great fabric online, with vegetables. Beautiful, bright colors. Eggplant, Cucumbers, Tomatoes. I didn’t know what I would use it for, but I wanted it. So I bought it and saved it,” Lesko says. “It’s called your stash.” Lesko soon discovered the perfect use for her vegetable stash.

“When **Charlie Arntzen** went up as ASU Regents’ Professor, I thought: Tomatoes! Charlie works on tomatoes. What can I make him? Well, a tie.” She adds, “I’m obsessed with it now. I have to find the appropriate fabric for each individual.”

Regents’ Professor **Stephen Pyne** also received a tie, with flames on it, and **George Poste**, recently named a Regents’ Professor, just received one with Aztec pattern in maroon and gold. “The ties are mostly gifts for big honors,” Lesko explains.

Lesko has even made ASU President Michael Crow a tie. “He always wears maroon and gold, but always with stripes. I got tired of seeing those stripes, so I made him something prettier.” Crow’s response? “He says that he’s added it to his collection, though I’ve never seen him wear it,” Lesko says.

Lesko’s favorite tie is the one she made for **James Collins**, Virginia M. Ullman Professor of Natural History and Environment. “Salamander material isn’t easy to find, but I found some material with a mix of lizards and salamanders. I took the fabric to Tony Gill (curator of ASU Research and Teaching Collections) who pointed out which ones were actually salamanders. Then, since the fabric was really bright and the print really big, I scanned it into the computer and then miniaturized it. There is fabric that you can put through a printer, so I printed them onto fabric and did some modern art appliqué behind it, on navy blue.”

Lesko has made around 10 ties, and a vest. The vest was for **Jane Maienschein**. “She was one of the first Regents’ Professors, but I wasn’t here then. I felt she needed recognition.”

Who is next? Anne Stone. Stone is with the ASU School of Human Evolution and Social Change. Is Lesko becoming



“I pound flowers. You take flowers, lay muslin over them, and whack them with a hammer. This transfers the dye and some of the pattern to the cloth. You can then fill in the detail with a fabric pen. Special treatment fixes the colors indelibly onto the fabric.” One of her works, resembling a 19th century botanical print, hangs in the SOLS business office.

multidisciplinary? “No, not really. Anne Stone is housed in School of Life Sciences E-wing and she’s had some major articles published lately. She works on chimps and mummies. That’s why her vest will have fabric with hieroglyphics,” Lesko explains.

Though Lesko ties are highly touted pieces of fabric art, complete down to her “Off Center Creations” label, it is clear from a visit to her office that baby blankets are what really capture her heart. The wall behind her computer screen is coated with sweet smiles, dimples, bright eyes of children of many of the SOLS faculty, students, and staff. Nearly all have received a signature Lesko baby blanket – flannel on one side, satin on the other.

“Baby blankets are very special. For at least 80% of the kids, the blanket I made them becomes their favorite blanket,” Lesko says. “I identify with

these little kids who are meeting so many new people. If this blanket makes them more secure, then that is really something great to do.”

Nancy’s baby blankets have gained some local fame. One woman, whose daughter would not be parted from hers, ordered seven more for members of her family.

Lesko says that quilting has completely changed her life, and so too it seems the lives of many of the faculty, staff and their families at ASU. But perhaps it is really Lesko herself that is the biggest security blanket that SOLS faculty could ever need?



Exothermic-man

BY KARYN HANSON

A western-themed shirt pokes out from beneath a well-loved sweater as a man dashes across campus in the most direct route to the bus stop. Who was that sweated man? And why was he in such a hurry?

It's ASU Regents' Professor, **Stephen J. Pyne** and no, he's not going to a Mr. Rogers convention, he is just headed for a quiet place to process his fire-related musings.

As a young man, Pyne toiled along the fire lines as a National Park Service firefighter. Like many firefighters, Pyne became addicted to fire. He has returned to the fire lines through the years but mostly, this pyromaniac gets his "fix" from being a fire scholar.

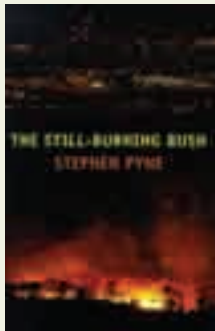
Fire is always on his mind. Why fire? Perhaps fire's allure as an under-explored field? According to Pyne, he has not come to this niche by design. He explains, "I just do stuff that doesn't fit into categories." He worked at ASU's West campus and the ASU Tempe History Department before finding a home in School of Life Sciences Biology and Society program in 1999. Pyne says that people in SOLS, "have a spring in their step" compared to other places and he enjoys the lively atmosphere. It's been a place for him to explore fire as a biological phenomenon and still relate to other fields like geology and history.

With SOLS as a base for his research, Pyne teaches such courses as: Fire, Exploration and Science, Environmental History, as well as Literary Non-Fiction. Pyne is a prolific writer. He has published a book approximately every 18 months since 1981. For him, writing seems to be an exothermic reaction he cannot control.

He writes feverishly while wedged between bookcases, maps, and a plump, worn chair in his cramped office in the A-wing. Drawing from recent travels, he is scribing a book on the Australian fire scene. This summer he expects to publish a comprehensive fire history of Canada, sponsored by the Canadian Forest Service.

Diverging somewhat from his usual fire-based pursuits, Pyne has recently embarked on a study of space exploration. The idea to write a book on the subject was ignited when he attended a history conference sponsored by NASA and the National Air and Space Museum in 2005. Although he has long been interested in various forms of exploration (his first book was on explorer/geologist G.K. Gilbert), space-themed writing is a new frontier. The upcoming book will feature the Voyager mission within the context of science and exploration history.

Pyne's unique studies and insight on fire have established him as the international "go-to-guy" for fire information. Fire ecology, range management, plant physiology, environmental science, history...his studies touch these disciplines without being exclusive to any. Evading titles, Pyne characterizes himself as "a scholar who found a connection with fire."



Man on Fire

BY DAVE BROWN

ASU Regents' Professor Stephen J. Pyne writes about fire like Tom Friedman writes about geoeconomies. Both delve into every detail and facet of a phenomenon that has become his obsession. Both are as prolific as they are erudite. Friedman, a columnist for the *New York Times*, has written four books on the sociological ramifications of his *forte*; Pyne has written at least 10 books on wildfire.

A riveting speaker, Pyne bills himself as an environmental historian. Having listened to him lecture on wildfire on several occasions, I too have become smitten with his perspective on the cultural relationships involving humankind's foremost tool. The man knows of what he speaks, having worked 15 seasons on a fire crew on the North Rim of the Grand Canyon. Wanting to read one of his books about the world outside the Southwest, I selected his most recent, "The Still-Burning Bush" (Scribe, Melbourne).

I chose well. This 137 page, 6" x 9" book, is a sequel to one of his seminal works, "Burning Bush: a fire history of Australia." The residue of a fellowship at Australian National University, the book summarizes the Australian fire scene since the infamous Ash Wednesday Fire of February 1983. More importantly, it is a synopsis of his previous books and summarizes his thoughts on fire on several continents including North America. More conversational than historic in tone, it is also an enjoyable read.

Through Pyne's lexicon, we learn the language of fire and discover that a fire regime is to a wildfire what climate is to weather. This is no simple task as we are delving into the evolutionary history of landscapes, drought patterns (both natural and unnatural), and the forces of lightning, wind, and fuel on a region's biota. We are then introduced to our own fiery roots through "fire-stick forestry," a process by which aborigines and pastoral peoples used fire to manipulate landscapes to their advantage.

Indigenous populations viewed fire differently than European settlers, and later, conservationists, especially when it came to forestry. Industrial farming and fossil fuels replaced slash and

burn agriculture. Not all landscapes are temperate forests existing in a 40-inch rainfall regime. Grasslands give way to brush and brush lands become denser. Forest understories intensify. Droughts come and trees die. The whole concept of fire suppression becomes increasingly unstable with time.

Pyne artfully weaves a tale of two Western countries that developed alternate philosophies toward fire while seeking to end the scourge of huge "megafires." As the 20th century progressed, American fire policy, formulated by the U. S. Forest Service, became a crusade for fire suppression. All wildfires were to be extinguished by 10 a.m. the day after being reported. The Australian model begged to differ. Shaking off an imperialistic tradition of wildfire prevention after World War II, the Aussies opted to control wildfire through prescribed "light burns" designed to reduce hazardous fuels.

But neither country has escaped the worldwide holocaust of megafires that began to stoke both continents in the 1980s and that continue today. Fire suppression has proven untenable and America has suffered through a series of disasters, not the least of which was the Yellowstone Fire of 1988. Australia, despite its alliance with fire, fared little better. Here, "greenies," as Pyne calls environmentalists, eroded that nation's "light burning" program through a concern for fire sensitive species, exotic weeds, and pestiferous smoke. Its forests turned to nature parks and reserves, Australia's dwindling number of professional fire crews were unable to control the conflagrations that followed.

The Brins Fire northwest of Sedona recently burned some 4,400 acres of beetle infested and drought desiccated pines and chaparral adjacent to some of the toniest real estate in Arizona, threatening the communities of Sedona, Oak Creek and Munds Park. Other fires on the Coconino and Kaibab are even larger. Pyne's lesson is that neither fire protection nor fire management is working at present. Philosophies alone will not change fire regimes nor keep fires at bay. Unable or unwilling to alter our landscapes, we may have to alter our life styles and learn to live with fire, tending the flames as well as controlling them.

Fire and Ice

BY PHILIP TARRANT



While the thermometer climbed into the 100s in early May and most people headed for the refrigerator or the grocery store to get some ice, **Brian Eddie**, a microbiology graduate student from associate professor **Susanne Neuer's** lab in the School of Life Sciences, planned to go a little farther afield for his ice supply. In mid-May, Eddie left Phoenix Sky Harbor airport for an early morning flight. Twenty-four hours and four flights later he arrived in Barrow, northern Alaska, ready to collect ice core samples from the Arctic ice pack.

Eddie is working in collaboration with two oceanographers, Christopher Krembs (University of Washington) and Andrew Juhl (Lamont-Doherty Earth Observatory, Columbia U.), all of them are interested in the micro-organisms that get trapped in the brine channels of Arctic Ocean sea ice. These brine channels occur when the ice pack forms and creates a network of high saline water pockets that do not completely freeze. These channels provide a haven for the algae, plankton and bacteria that are trapped as the surface sea layer freezes. Eddie and his colleagues are examining the natural history and adaptations of organisms capable of surviving in these harshest of conditions. It is this need for study subjects that has taken Eddie to Barrow.

Barrow, Alaska, is a town without paved roads, huddled in a barren landscape inhabited by polar bears and dotted with the skulls of whales killed by Inupiat hunters when an offshore breeze briefly opens a channel in the ice pack. These are the same hunters who also leave caribou hides stretched out to dry in the weak Arctic sun between the prefabricated buildings that provide both shelter for the town's inhabitants and rudimentary laboratory facilities for visiting scientists. While this is an alien environment for a visitor from the southwest desert, it is an ideal place to find ice cores.

To collect their samples, the three scientists made trips out onto the ice pack on snow mobiles. They traveled about eight miles across the frozen ocean, stopping at four sites to collect core samples: one from Chukchi Sea, one in the channel leading to Elson Lagoon and two in the lagoon itself. Brian obtained cores by drilling down into the ice pack with a large auger connected to a drill powered by a portable generator. At

each drill site, the auger produced a core about one meter in length and 10 centimeters in diameter.

To preserve the ice samples, Eddie stored each one in a large plastic bag placed in a conventional drinks-style cooler. To keep the cooler chilled until the return flight, he left it outside in the snow with an occasional period in a 25°C freezer for good measure. The coolers then traveled back as checked baggage, but with minimal impact on the samples inside.

Back on the ASU campus, Eddie processed the cores by cutting them into 10cm lengths, and dividing each of those into two halves. One half was archived, to be utilized if there were any processing problems with the original samples. The half selected for processing was melted and a stain added that visualized the nuclear DNA of any organisms present in the water. These organisms were then counted under a microscope. After the count, each sample was treated to fragment the DNA and the fragments compared with an on-line database to identify the species present. By doing this for each 10cm core sample, Eddie determined the species composition along the entire meter core taken from each brine channel.

So what does all this hard work hope to tell us? Eddie has three goals; first, he is interested in whether sea ice is a source or a sink for organic carbon. His second goal is to see if other types of organisms, such as sulphate producers, are common in this low light environment. This latter question is particularly relevant because Brian is involved with the Europa working group which is exploring what kind of life might exist under the icy surface of Europa, a moon of Jupiter. Sea ice is one of the earth-analogue systems that may be used to study the astrobiological potential of the ocean and icy crust of Jupiter's fourth largest moon. Finally, detailed understanding of the vertical distribution of eukaryotic and prokaryotic micro biota in sea ice will be crucial in predicting how sea ice biota respond to the warming trend currently seen in the Arctic Ocean.

With this in mind, while most people would agree that going to Alaska for ice is extreme, you have to admit that when it comes to the study of extreme organisms, grocery store ice just doesn't have what it takes.

Acceleration, Collaboration and Innovation

BY AMY K. ERICKSON



Jeffrey Trent's early fascination with science didn't impress his biology teacher at Arcadia High School.

As Trent recalls, she laughed at his idea of pursuing a career in science. However, anyone following bioscience news in Phoenix over the past four years would have little doubt that Trent chose the right profession. In the fall of 2002, Trent returned to his home state of Arizona where his career (as a noted leader in genetic medicine) has come full circle; he is now president and scientific director of the non-profit Translational Genomics Research Institute (TGen) and a School of Life Sciences full-time tenured professor.

Trent is the driving force behind the Phoenix-based institute's efforts to bring new medicines to patients faster. He is also a premier cancer researcher with a specialization in the genetics of melanoma. Prior to returning to Arizona, Trent held multiple posts at the National Institutes of Health (NIH) and was the founding scientific director of the National Human Genome Research Institute, the entity that successfully decoded the human genome.

Though not a physician, Trent shares a physician's sense of urgency when it comes to finding new treatments for patients. Trent is fond of saying that laboratory discoveries that stay in the laboratory don't help patients, which is why, as TGen marks its fourth birthday in September, the institute is expanding its research from discovery to clinical applications. For Trent, it's all about developing earlier diagnoses and smarter treatments for patients as rapidly as possible.

A key component to accelerating TGen's research, which is focused on neurological diseases, metabolic diseases and cancer, is the ASU-TGen IBM supercomputer, a system capable of making more than two trillion calculations per second. This kind of computing power is essential for analyzing the billions of data points generated by TGen's researchers each day.

Trent is quick to point out that much of TGen's success is built upon partnerships and collaborations. By leveraging collaborations with healthcare, educational, as well as public and private entities, the research done at TGen has an impact on patients in Arizona and beyond.

TGen has a number of partnerships with ASU, the most recent of which is the launch of a new joint Center for Systems and Computational Biology in collaboration with the Biodesign Institute. Trent and the director of the Biodesign Institute, George Poste, are co-directing the newly established facility. One of the first of its kind in the nation, the new center will accelerate the pace of biomedical research and directly impact patient care by developing smarter treatments and targeted therapies tailored to an individual. TGen and the Biodesign Institute are also collaborating on a multi-institutional grant to identify countermeasures to possible terrorist attacks involving radioactive materials.

Trent's dedication to Arizona and the biosciences is clear when it comes to training the next generation of geneticists and researchers. In addition to partnering with ASU as they work with the University of Arizona and others to create a new school of medicine located in downtown Phoenix, several ASU students are participating in TGen's prestigious and competitive summer internship program. At TGen, interns work side by side with researchers to solve complex problems and gain hands-on experience in a laboratory. Trent believes that investing in the education of local students and nurturing bright young minds is one of the best ways to build a high-level bioscience workforce in Arizona. TGen, in partnership with ASU, has an extraordinary opportunity to train future scientists with the ultimate goal of bringing new medicines to patients who need them the most, says Trent.



Nanotechnology: It is more than just a matter of size

BY MARGARET COULOMBE

Something very small will make a very large impact at ASU Barrett Honors College this fall.

B. Ramakrishna, associate professor in the School of Life, will teach a new course that examines environmental nanotechnology and nanobiotechnology. The course will be titled “Nanotechnology: Perspectives and Entrepreneurial Opportunities”.

“It [the course] will be a hybrid course, combining technical content with examination of societal, regulatory and policy issues surrounding entrepreneurship in the field of nanotechnology,” Ramakrishna explains. A hybrid course weaves real time instruction in a classroom together with online visits and chats between students. The method of course delivery serves to illustrate the movement towards the increased role of technology at Arizona State University, with nanotechnology on the cutting edge of this movement.

Ramakrishna has made a career of melding science education with current research trends. He has been actively involved in several programmatic developments that encourage ASU’s partnering with regional K-12 opportunities. His exploration of nanotechnology is just the next step of training.

Albeit, a very small step that has resounding effects on its surroundings. A nanometer is one-billionth of a meter. Nanoscale is considered anything that is less than 100 nanometers in size. That rules out, say, anything that is the thickness of a sheet of paper (100,000 nanometers), incorporating instead something the width of a DNA molecule (2.5 nanometers). Why make a big deal out of something so small? An article in June 2006 issue of the *National Geographic* delves deeply into why nanotechnology may change our world:

“Nanotechnology matters because familiar materials begin to develop odd properties when they’re nanosize. Tear a piece of aluminum foil into tiny strips, and it will still behave like aluminum – even after the strips have become so small that you need a microscope to see them. But keep chopping them smaller, and at some point – 20 to 30 nanometers, in this case – the pieces can explode. Not all nanosize materials change properties so usefully (there’s talk of adding nanoaluminum to rocket fuel), but the fact that some do is a boon. With them, scientists can engineer a cornucopia of exotic new materials, such as plastic that conducts electricity and coatings that prevent iron from rusting. It’s like you shrink a cat and keep

shrinking it, and then at some point, all at once, it turns into a dog.”

Nanotechnology doesn’t just mean novel product development; it also means revolutionary new ways of manufacturing, with nanomachines, nanofactories, and nanobots. The technology could create innovations that impact health care, communications, environment, agriculture, computing, transportation, and energy. It has also raised concerns about the ethics, hazards and dangers of such advances.

Considering the broad impact that nanotechnology will have on society, students for the new course will be recruited from a variety of disciplines: law, business, psychology, science, engineering, public programs and finance. The synergistic qualities of these students focusing on one topic in this new course will undoubtedly provide exceptional training for the future business leaders, politicians and research scientists that ASU will educate and that the technology will demand.

The course will be run with participation from the ASU Ira A. Fulton School of Engineering and Barrett Honors College. While a hybrid course, it has been designed to spark debate and includes guest lecturers from industry and business who will cover a range of topics, such as global competition, commercialization, regulatory issues, intellectual property rights, and ethics. The online work groups will be called “e-teams” and will require students to work in partnership with panels of industry experts, venture capitalists, and lawyers to develop business and marketing plans. Ideally, some of the partnerships formed over the course of a semester may extend through a second semester, again taking a small set of individuals and increasing their scope to make a much larger impact.

Funding for the course was provided by a National Collegiate Inventors & Innovators Alliance (NCIIA) award shared by Ramakrishna, and his Fulton School of Engineering collaborators, Thomas Duening, director of Entrepreneurial Programs, and Vincent Pizziconi, associate professor in the Harrington Department of Bioengineering. NCIIA is supported by the Lemelson Foundation “which seeks to inspire, encourage and recognize inventors, innovators, and entrepreneurs who are improving lives through invention.”

In the end, it is not the measure of students or instructors, or of the scale of technology that matters. Instead, it is the size of the positive impact your efforts have on the world around you. Ramakrishna has made a big difference with an idea and the smallest of technology.



Curator of Animal Collections, Anthony Gill and Assistant Librarian, Katherine O'Clair at the Noble Library exhibit.

Vitality highlights ASU Natural History Displays

BY MARGARET COULOMBE

The enthusiasm of **Kathleen Pigg**, associate professor in the School of Life Sciences, researcher in paleobotany, and member of the Natural History Collections Committee, makes me wish I had brought a tape recorder. She is part of the exciting process that is invigorating SOLS Natural History Collections at ASU.

"We are trying to bring our disparate collections together as a group with other resources...not only within the school, but within the state," Pigg noted. "People just don't know what we have."

But now they will have a better idea. New public displays have been opened in both the Noble Library and the ASU Life Sciences A-wing, bringing together a sampling of all the collections. SOLS Natural History holdings are extensive, with a world-class shell collection; a mammalian collection containing 8,500 representatives; 20,000 jars of fishes; 35,000 reptile and amphibian specimens; a herbarium housing 255,000 plants, plus a lichen collection with 5,500 species and more than 100,000 specimens; and an assembly of insects numbering in the hundreds of thousands.

How many flies does one collection need? **Anthony Gill**, curator of animal collections, explains, "People often question whether regional collections have significant value. But what they don't understand is that local collections can have enormous depth, lending insight into the variation that exists

within a taxa. Something that, say, one or two samples in the British Museum cannot do."

Certainly Gloria Baker was impressed with her first visit to the A-wing collection, "Events like this bring visibility to what's here. When my boys are out of school, they can come hang out with me and see this!"

Baker was not alone in her thinking – at the A-wing inauguration visitors spilled into adjacent halls. **Witt Taylor**, Pigg's graduate student in paleobotany, memorialized the event by creating a "dirt" cake, made of crumbled Oreo cookies with artificial flowers and "rocks." "It's got the whole natural history collection in it!" he noted.

Finley Bryan, professor and executive director of the Cape Fear Botanical Garden in North Carolina believes that events like these greatly improve the visibility of the collections and generate interest. "Even before the display was officially opened, there were students stopping and looking – even without food!"

Jon Harrison, professor and associate director of facilities for SOLS, helped inaugurate the new displays – along with **Robert Page**, Foundation Professor and founding director of SOLS and **Thomas Nash**, director of the ASU Lichen Herbarium.



A sampling of the Natural History Collections displayed in ASU Life Sciences A-wing.

“This [Natural History Collections at ASU] really is the closest thing that Arizona has to a Natural History Museum. It is a tremendous resource,” Harrison stated.

Page added, “The School [of Life Sciences] is unique. We have a strong tradition of organismal biology and have strengths manifest in our collections, faculty and staff. The question now is how do we integrate those strengths?”

This is the very question that propelled Page to mandate the formation of a Collections Committee to revamp displays and bring both visibility to collections and a more integrated use of them in teaching and outreach.

The ASU Lichen Herbarium is a good example of what visibility brings. It is one of the largest collections in the western U.S. Nash and **Robin Schroeder**, who manages the Herbarium, receive daily requests for loans of materials, between one to 300 specimens apiece, from institutions world-wide, mainly in Europe. Behind closed doors, the Herbarium’s repository is systematically arranged in an organized series of grey, metal specimen drawers – each filled with envelopes. Each envelope, made of archival paper, bears a barcode as well as several specimens of lichen and notes detailing ultraviolet and chemical characteristics. With this much collected material all in one place, one wonders about preservation.

“Bugs don’t eat lichen, but caribou...now a herd coming through here that would be a big problem!” Schroeder says.

But beyond dedications and displays, how do people find out about the Herbarium and access its collections? SOLS Natural History Collections has also expanded its virtual image and developed SEINet, an informational infrastructure to support all the collections. One of the creators of SEINet, Schroeder explains, “SEINet has 10 participating databases, including that of the Navajo Nation, but there’s more to come. I’ve still got birds, insects and ‘herps’ to go.”

Pigg reflects on the new direction that collections is taking, “We want to know how research, teaching and outreach interests might interface with Collections and what will help us make the Collections a more valuable and visible face for SOLS.”

A sentiment echoed, in jest by Page, “Before you grind that animal up and sample its DNA, be sure to come here [the new displays] so you know something about what it was.”

Come visit the A-wing or Noble Library exhibit or Natural History Collections online, <http://nhc.asu.edu> or <http://seinet.asu.edu> or contact Kathleen Pigg kpigg@asu.edu.



1. Cynthia Donahue 2. Cheri Peterson 3. Maxine Proctor (Director) 4. Evangelina Gonzales 5. Phillip Scharf 6. Leon Bryant 7. Bettie Julkes 8. Faye Farmer 9. Alice Garnett

A Look at the SOLS Student Services Office

BY DAVID E. BROWN AND FAYE FARMER

Do you remember what it was like to be age 18, full of wonder and thrilled to be in college? Can you imagine what it would be like to be the first in your family to attend a university?

While you are imagining this scenario, think about how it must feel to attend a university with more students than the population of many towns and 120 majors scattered across four campuses. “What do I major in?” can be the most difficult question ever posed. Getting lost in the shuffle is not only easy, it appears inevitable – but that is where the School of Life Sciences Undergraduate Student Services and Academic Advising Office steps in.

The student services office ensures that entering and transfer undergraduate students successfully navigate ASU's requirements to achieve their degree in a timely manner. Located in the Life Sciences C-wing room 206, the office typically has a line of students that stretches out the front door and down the hall.

Visiting an advisor is mandatory for SOLS students, beginning at the freshman level. This keeps the office busy; 2,000 students in six majors fall under the auspices of SOLS including, biology, conservation biology, biology and society, microbiology, molecular biosciences and biotechnology, and plant biology. An additional 2,000 students are within the pre-health professions purview. Advisors not only advise in many of these cases, but also counsel - creating friendly bonds with students that continue on through graduation.

The office is under the direction of **Maxine Proctor**, a twenty year student services veteran. Proctor oversees six advisors and three staff members. The School of Life Sciences' evolution into a school in 2003 increased the number of majors available to students and required cross-training of all advisors to serve a larger, more varied student population. However, the advisors continue to have a field of specialty as well. Proctor, **Cheri Peterson**, and **Phillip Scharf** focus on the specialized requirements of a pre-health professional student; assisting students interested in becoming anything from a naturopath to hygienist to podiatrist with professional school pre-requisites, standardized exams, medical school applications, letters of recommendation, and interviews. Proctor has also taught a course on "Introduction to Medicine" for these students for the past five years. **Bettie Julkes** and **Leon Bryant** are charged with the task of identifying, promoting and coordinating student internships. In fact, 20% of all SOLS undergraduates gain internships through this office. Internship opportunities are as diverse as the students in SOLS and range from working with wildlife to culturing pathogens. **Faye Farmer** acts as a liaison between the office and research opportunities, as well as coordinator for the SOLS-Learning Resource Center (a student computer and study room on the first floor of Life Sciences C-wing). The smooth operation of the office is due to the behind-the-scenes office manager, **Alice Garnett**. The front of the office that is regularly filled with students is cheerfully staffed by **Evangelina Gonzales**. In recognition of their great student service and training excellence, the entire staff was nominated this year for the Student Affairs Tribute to University Staff awards (STATUS), an annual university staff excellence award. In addition, three staff members, Elizabeth Warriner, Yvette Smith, and Cynthia Donahue have advanced to managerial and advising positions at the university level. With more than 70 years of advising and students services experience, one might think it's all about the connection

with students over their coursework and life goals. However, student services office is also responsible for several annual events that cater to student recruitment, retention and overall academic achievement. The *Internship and Career Fair* each October attracts close to 40 local and regional employers. The *Pre-Health Professions Fair*, held every February, which promotes health-centered professional schools and careers, has tripled the number of students and vendors attending since its inception. At the end of each school year, the office also coordinates an awards ceremony honoring high achieving juniors and seniors. Additionally, the office hosts workshops examining how to create résumés and effectively interview for professional schools, internships and employment.

The staff not only supports students, it also engages with the faculty. When faculty members have questions regarding courses within the SOLS curriculum, procedures for grades, or letters of recommendation, they call Student Services for answers. The office is also responsible for recording grades from faculty members who have run independent study credit through their laboratory or field research experience.

While advising comes first, it is obvious that SOLS student services office does much more than that. The office provides a comprehensive package of services that readily meets the varied academic needs of a diverse undergraduate population. Gratification for the staff is when the wide-eyed youth who arrived on campus and found his or her way to Student Services after freshman orientation and asked: "what should I major in?", returns four years later with a confident gaze to say: "Thank you for all you did."



Robert Page



George Poste

Faculty Awards:

Robert Page, Founding Director of the School of Life Sciences and Foundation Professor of the Life Sciences, has been selected as an American Academy of Arts & Sciences Fellow this spring. The formal induction ceremony will be in October 2006.

George Poste, Director of the Biodesign Institute at ASU and Del E. Webb Distinguished Professor of Biology, has been inducted as an ASU Regents' Professor.



Andrew T. Smith



Bertram Jacobs

Andrew T. Smith, Associate Director of Undergraduate Programs and professor in the Human Dimensions of Biology faculty group, was awarded the *ASU Parents Association Professor of the Year Award* for 2006. Smith was chosen from a field of 25 distinguished nominees from across the ASU campuses. The award was created to recognize "extraordinary dedication to undergraduate education," and to single out professors from throughout the university "who exemplify a passion for teaching and who excel in both undergraduate teaching and their area of research or creative activity."

Bertram Jacobs, professor in the Biomedicine and Biotechnology faculty group, received *special recognition* from the ASU Parents Association for his contribution to undergraduate education and excellence in creative or research activities.



Jane Maienschein



Manfred Laubichler

Jane Maienschein, Regents' Professor, Parents Association Professor and Director of the Center for Biology and Society, and professor in the Human Dimensions faculty group was awarded the *2006 Gary Krahenbuhl Difference Maker Award* from the College of Liberal Arts & Sciences. The Gary Krahenbuhl Difference Maker Award is an annual award to recognize a faculty member who personifies the spirit of difference-making demonstrated by Gary Krahenbuhl throughout his service as Associate Dean and Dean of the College of Liberal Arts and Sciences. The criteria state that the recipient will be:

- Tenured, respected scholar with a broad vision of academic scholarship
- Effective in the scholarship of discovery, integration, application and teaching;
- Engages students and is unselfish
- Strategic thinker who cares about the broader institution
- Capable of moving ideas into action without concern for credit, consistently working for the greater good of the college and the university and persistent in developing institutional programs;
- Adaptable and successful in mobilizing groups of faculty to produce change.
- Demonstrate an outstanding ability to interact with external constituencies, service as effective advocates for the college and the university.

Manfred Laubichler, assistant professor in the Human Dimensions of Biology faculty group, was awarded the *College of Liberal Arts and Sciences Dean's Distinguished Teaching Award*.



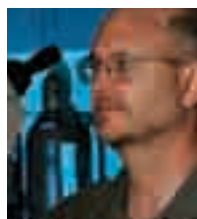
Ronald Rutowski



Maxine Proctor



James Collins



Charles Kazilek

Ronald Rutowski, professor in the Organismal, Integrative and Systems Biology faculty group, was awarded a \$1.8 million dollar grant through the Howard Hughes Medical Institute to develop AzBioNet. The network is an opportunity for undergraduate students to interact and develop professional relationships with scientists who work at major research and medical institutions in the Phoenix metropolitan area. Others working with Rutowski on the HHMI proposal include **Jane Maienschein**, Regents' Professor and Director of the Center for Biology and Society; **Mark Jacobs**, Dean of the Barrett Honors College; **Maxine Proctor**, Director of Undergraduate Academic Advising and Student Services; and **James Collins**, Assistant Director of Biological Sciences at the National Science Foundation, on leave from ASU School of Life Sciences where he is a Virginia M. Ullman Professor.

Charles Kazilek, Director of Technology Integration and Outreach was awarded the *Donald J. Nash Memorial Award* at the American Association for the Advancement of Science – Southwest and Rocky Mountain Division Meeting (AAAS-SWARM). This award was established in honor of Dr. Donald J. Nash, the executive director of SWARM from 1993 until his untimely death in 2002. It is a judged award presented to the most outstanding presentation at the AAAS-SWARM Annual Meeting. The 2006 award consists of a plaque and a check for \$500.



J. Alan Rawls



N. Jeanne Wilson-Rawls

Appointments:

Andrew T. Smith, professor in the Human Dimensions of Biology faculty group, accepted the position of Associate Director of Undergraduate Programs for School of Life Sciences. His three year term began July 1.

J. Alan Rawls, associate professor; **N. Jeanne Wilson-Rawls**, assistant professor; and **Kenro Kusumi**, associate professor; all in the Genomics, Evolution and Bioinformatics faculty group – have received joint appointments to the University of Arizona's College of Medicine (Phoenix).



James Elser



Jianguo (Jingle) Wu

Jianguo (Jingle) Wu and **James Elser**, professors in the Ecology, Evolution and Environmental Science faculty group, have been awarded a \$1.07 million National Science Foundation grant to test biodiversity-ecosystem functioning relationships in an ecological stoichiometry framework in Mongolia. China will additionally contribute about US \$2.2 million over the next five years to the project.

Faye Farmer was elected board member of the Central Arizona Chapter of Association for Women in Science (AWIS). Farmer has also been recently appointed as Academic Specialist Coordinator in the undergraduate student services and academic advising office.



Faye Farmer



Jacob Sahertian

Charles Kazilek, Senior Research Professional and Visualization Lab Group Manager with School of Life Sciences, was recently appointed Director of Technology Integration and Outreach for School of Life Sciences.

Jacob Sahertian has been appointed Manager of the Visualization Laboratory in the School of Life Sciences.

AWARDS AND RECOGNITIONS



Melissa Meadows



Lisa Taylor



Kevin McGraw



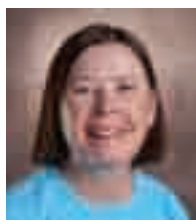
Carter Tate Holbrook



Jennifer Fewell



Dale DeNardo



Brenda Hogue



Douglas Chandler



James Watts



Danna Schock



Nathan Morehouse



Jonathon Davis

Student Awards:

Graduate students, **Melissa Meadows** and **Lisa Taylor**, from assistant professor **Kevin McGraw's** lab; and **Aimee Kessler**, with Parents Association professor **Andrew T. Smith**; were among the 907 *National Science Foundation Fellowship* winners for 2006. The NSF program is a national competition for graduate students in science, math and engineering. Fellowships are either one or three years in duration. Students receive a \$30,000 stipend and a cost-of-education allowance of \$10,500 and \$1,500 travel grant for each year of the award. Meadows, Kessler and Taylor received support for three years. They are joined in 2006 by 2005 Fellowship Award winner, **Carter Tate Holbrook**, with associate professor **Jennifer Fewell's** laboratory, who deferred his award. Four other graduate students received *Honorable Mentions*: **Matthew B. Toomey**, also with **Kevin McGraw**; **Zachary R. Stahlschmidt**, with assistant professor **Dale DeNardo**; **Jonathan M. Douglas**, with professor **Ronald Rutowski**; and **Ariel L. Jones** who is with associate professor **Brenda Hogue**.

James Watts, graduate student with **James Elser**, Associate Director of Research and Training Initiatives Office and professor of the Ecology, Evolution and Environmental Science faculty group, was awarded SOLS Outstanding Teaching Associate of the Year for 2006. Graduate students **Cindy Cordery**, with professor **Douglas Chandler** in the Cellular and Molecular Biosciences faculty group, and **Danna Schock**, with professor **James Collins** in the Ecology, Evolution and Environmental Science faculty group, were also recognized for their contributions as Teaching Associates of the Year in School of Life Sciences.

Nathan Morehouse, a graduate student with professor **Ronald Rutowski**, and **Jonathon Davis**, a graduate student with assistant professor **Dale Denardo** of the Organismal, Integrative and Systems Biology faculty group, were awarded the Mentoring Award from the ASU Graduate and Professional Student Association Teaching Excellence Awards Program.

SOLS Events:

September 29

ASU Parent's Weekend Open House and Raffle. 12 – 4 p.m.
School of Life Sciences Learning Resource Center, LSC 102
Contact: Faye Farmer at (480) 965-5613

October 6

Opening of the exhibit: "The Universe Within: The Microscopic Worlds of Cell Biology"; showing original images of cellular order and dynamics from light and electron microscopy. 6 – 11 p.m.
Location: Tilt Art Gallery, 919 West Fillmore Street, Phoenix Arizona 85007

October 11

3rd Annual Career, Internship, Graduate Fair 10 a.m. – 2 p.m.
Life Sciences Complex C and E-wing shared courtyards
Contact: SOLS Undergraduate Advising at (480) 727-6277



Carsten Duch



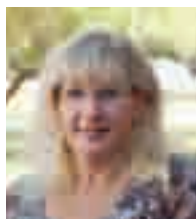
Kenro Kusumi



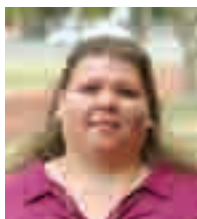
Stephen Pratt



Jamie Tyler



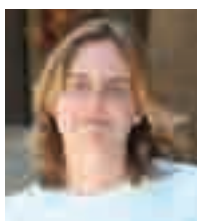
Alice Garnett



Evangelina Gonzales



Bret Judson



Christine Weber

Welcome SOLS New Hires:

Carsten Duch, Associate Professor, Integrative Neuroscience

Andrew Hamilton, Assistant Professor, Philosophy of Biology/Epistemology

Kenro Kusumi, Associate Professor, Genomics, Evolution & Bioinformatics Faculty Group

Douglas Lake, Associate Professor, joint appointment SOLS/Biodesign Institute

Cheryl Nickerson, Associate Professor, joint appointment SOLS/Biodesign Institute

Lei Lei, Assistant Professor, Neuroscience

Stephen Pratt, Assistant Professor, Social Complexity

Jamie Tyler, Assistant Professor, Bioimaging/Neurobiology

Tatiana Ugarova, Associate Professor, Metabolic Biology

Quentin Wheeler, Professor, Systematic Biology



Douglas Lake



Quentin Wheeler

New Staff:

Karin Ellison, Manager, Responsible Conduct in Research Program

Jon Finley, Technical Support Analyst, Principal

Alice Garnett, Administrative Associate, Undergraduate Student Services Office

Evangelina Gonzales, Office Specialist, Undergraduate Student Services Office

Kevin Haight, Research Specialist

Andrea Judson, Research Specialist

Bret Judson, Manager, W.M. Keck Bio-imaging Laboratory

Ian Vandeventer, Technical Support Analyst, Associate

Yong Wang, Research Specialist, Senior

Christine Weber, Laboratory Coordinator BIO 187-188

October 21

ASU's Homecoming event:
School of Life Sciences Learning Resource
Center Open House, LSC 102.

Contact: Faye Farmer
Phone: (480) 965-5613

November 29

Julia Rosen, ASU Assistant Vice President for
Economic Affairs in the Office
of the Vice President for Research
and Economic Affairs, speaks about:
"ASU's Role in Advancing Arizona's
Knowledge Economy."

Sponsored by the Association of Women
in Science. 7 p.m.

Location: LSE 104.
For information contact:
Winifred Doane: wdoane@asu.edu

January 16, 2007

First-Day-of-School Open House.
8 a.m. – 12 p.m.

School of Life Science Learning Resources
Center, LSC 102

Contact: Faye Farmer
Phone: (480) 965-5613

For information on upcoming events:
<http://sols.asu.edu/events/>



OBSERVATIONS



Dr. George Bateman and Students, 1927

Dr. George Bateman was the first faculty member with a doctoral degree at ASTC when he arrived in 1927. He taught physical science, and after nearly 40 years in service at ASU, he spearheaded the design and construction of two major buildings – the Agriculture Building and the Physical Sciences Center. He was also instrumental in the development of four departments, Zoology, Botany, Chemistry and Physics. The Bateman Physical Sciences Building is named for him.

Text and image:

Courtesy University Archives, Arizona State University Libraries.



Dr. Leah Gerber and Students, 2004

Dr. Leah Gerber is an assistant professor in the School of Life Sciences. One of the classes she teaches is Bio. 494, Marine Conservation, offered this fall. Gerber uses “quantitative tools from conservation science for decision-making in endangered species recovery, marine reserve design, and disease and conservation.” For more information about Dr. Gerber: <http://sols.asu.edu/faculty/lgerber.php>

Contact us!

If you have information to include in this newsletter, please contact us at SOLS@asu.edu.

We are particularly interested in reconnecting with Alumni and Emeriti. Manuscripts should be less than 1000 words, photos should be high resolution, and all submissions should include all pertinent contact information.

Submissions should be sent to Managing Editor, **Margaret (Peggy) Coulombe**, margaret.coulombe@asu.edu, attention SOLS Newsletter, P.O. Box 874501, Tempe, Arizona, 85287-4501.

http://sols.asu.edu/events/newsletter_sign_up.php

If you are interested in learning about the many ways you can contribute to the School of Life Sciences and ASU please visit the ASU Foundation web site.

<http://www.asufoundation.org/giving/>

We reserve the right to edit all submissions. © 2006 ASU School of Life Sciences.